output connection), wherein the activation signal output from the payload functionality is fed to the line driver and transmitted to the connected module. Furthermore, a module that includes two or more connections may include multiple payload functionalities, each connected between an input connection and an output connection of the module.

[0010] Modules may have different activation signal routing schemes. A basic slave module includes two connections (with payload functionality connected therebetween), and is operative to propagate an activation signal between these connections. A splitter functionality, included for example in a basic splitter module, involves receiving an activation signal in a single connection and transmitting it (e.g., after a delay and/or payload functionality operation) to two or more connections. A loopback functionality, included for example in a basic loopback module, involves transmitting of an activation signal to the connection it was received from (e.g., after a delay and/or payload functionality operation). A master module include means, such as a manually operated switch, to produce an activation signal without receiving any such activation signal from a connected module, and thus initiates the propagation of the activation signal in a system. A module may double to include various functionalities, such as a slave/splitter module including both slave and splitter functionalities, a master/loopback module including both master and loopback functionalities, and a master/splitter module including both master and splitter functionalities. The signal propagation within a module may use either level activation (active low' or 'active high') or edge triggering (riding or trailing edge), or any combination thereof.

[0011] The propagation of the activation signal in the system may be unidirectional (e.g., simplex) using 1-way modules, operative to pass the activation signal only in one direction (from an upstream connection to one or few downstream connections). In such system, the activation signal is initiated in a master module, and then it propagates through the connected modules downstream (away from the master module) until reaching the module (or the modules) connected only upstream, rendering the system idle afterwards. The system remains idle until the sequence is re-initiated by the master module, since each such initiation produces a single propagation from the master module downstream.

[0012] The activation signal can be initiated by a switch, such as a human operated mechanical switch, which is housed in the master module or connected thereto via a connector. Alternatively or additionally, the master module may repetitively generate activation signal upon powering up or controlled by the user (e.g. via a switch). Further, the activation signal may be triggered by a physical phenomenon using an appropriate sensor, such as a sensor responsive to temperature, humidity, pressure, audio, vibration, light, motion, sound, proximity, flow rate, electrical voltage, and electrical current. The activation signal may be generated in response to comparing the sensor output (after conditioning) with a set value. The sensor and its related circuits (e.g. amplifier, comparator and reference generator) may be partly or fully housed within the master module enclosure, or external to it.

[0013] The propagation of the activation signal in the system may be bidirectional using 2-way modules, operative to pass the activation signal in both directions (from an upstream connection to one or few downstream connections and from a downstream connection to one or few upstream connections). The activation signal passing between two modules may be half-duplex or full duplex. Full duplex transmission may use a dedicated wire pair for each direction, totaling four conductors. Alternatively, a hybrid circuitry may be used providing two-way communication over two conductors. In a 2-way system, the activation signal is initiated in a master module, and then it propagates through the connected modules downstream (away from the master module) until reaching the module (or the modules) having a loopback functionality. The loopback function reverts the propagation direction from downstream to upstream towards the master module. Upon reaching the master module the system remains idle until the sequence is re-initiated by the master module, since each such initiation produces a single propagation cycle from the master module downstream followed by a single upstream sequence ending in the master module. In the case wherein the master module further includes a loopback functionality, the activation signal will be reverted downstream again, causing infinite system cycling downstream and upstream.

[0014] A payload may be controlled by a control signal, which may be the activation signal or depend on the activation signal, such that the payload is activated when the control signal is active. Alternatively, the module may be latched and stays activated upon triggered by a control signal. Further, a payload may be toggle controlled, wherein the control signal shifts the payload from a state to another state (or between two states such as 'on' and 'off') each time the control signal is active.

[0015] A module may be individually powered from a power source. The power source may be integrated into the module enclosure, and can be a battery, either primary or rechargeable type, which may reside in a battery compartment. Alternatively, the power source may reside external to the module enclosure, such as powering from AC power outlet via common AC/DC adapter containing a step-down transformer and an AC to DC converter (rectifier). A DC/DC converter may be used in order to adapt the power voltage from a source into one or more voltages used by the various module electrical circuits.

[0016] Alternatively, a remote powering scheme may be used, wherein a single connection to a power source may be used to power few or all of the modules in the system. A module is powered from the power carrying wires, and may supply the power to other modules connected to it. The power may be carried (either as AC or as DC power) to the modules in the system over wires connecting the modules. Dedicated power conductors may be used, being separated from the wires used for propagating the activation signal. The same connector may be used to connect to both the power and the activation signals wires. Similarly, the same wire pair (or wire pairs) carrying the activation signal (or other data) may be concurrently used to carry the power signal (either as AC or as DC power). The activation signal and the power signal are concurrently carried over the same wires either using multiplexing such as frequency division multiplexing (FDM) wherein filters are used to separate and/or combine the signals, or by using split-tap transformer or by using phantom channel for carrying the power. In the case of remote powering, a powering functionality (either as a dedicated powering module or integrated with another module functionality) is used in order to connect to be fed from the power source, and to the system module (or